AD_____

Award Number: W81XWH-10-2-0061

TITLE: Simulation Learning: PC-Screen Based (PCSB) versus High Fidelity Simulation (HFS)

PRINCIPAL INVESTIGATOR: Kristine Qureshi, RN, DNSC, APHN-BC, CEN
COL Denise Hopkins-Chadwick, RN, Ph.D.

CONTRACTING ORGANIZATION: University of Hawaii
Honolulu, HI 96822-2309

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Fort Detrick, Maryland 21702-5012

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14. ABSTRACT

The purpose of this project is to develop and test a model that can be used to compare different types of simulation learning for military and civilian nursing trauma skills. The model will enable measurement and comparison of changes in knowledge, skills and attitudes of the learner, as well as overall cost effectiveness for each type of simulation (PC screen based vs. high fidelity simulation). The final model will be useful for evaluation of simulation learning for many other military and civilian nursing (and other types of healthcare providers) clinical skills. This is completion of the second year of the project; all three of the PC screen based and high fidelity simulation scenarios, lesson plans, detailed training tasks, evaluation model (including the pre and post assessments), and cost assessment model have been developed. The Phase II IRB has been approved, but the Clinical Investigations Regulatory Office (CIRO) must still approve the Cooperative Research and Development Agreement (CRADA) before testing of the model that was developed can begin on human subjects. There are no research findings to report at this time as we have not yet tested the model that was developed, however one poster presentation about the project was made.

15. SUBJECT TERMS
Simulation Teaching Methods

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER *(include area code)*
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INTRODUCTION:

As the number and complexity of disasters increases across the world, increased attention is being paid to disaster and trauma nursing. Since 2001, the US has experienced numerous significant natural, technological and human made disasters. Presently, a large number of military nurses are directly involved in providing care to wounded soldiers on the battlefields of Iraq, Afghanistan, and other areas throughout the world. Core disaster nursing competencies have been identified, but we have not yet been able to identify the most efficient and effective methods for competency based disaster nursing education. Identification of methods for training the nursing workforce with regards to essential trauma nursing functions will assure a more competent nursing workforce and serve to reduce error and improve trauma victim outcomes. The purpose of this project is to identify the most efficient and effective method for teaching trauma nursing skills to military and civilian nurses. The research effort aims to develop and pilot test an evaluation model that can be used to compare different learning outcomes and cost effectiveness for PC Screen based (PCSB) learning versus high fidelity simulation (HFS) learning for military and civilian disaster and trauma nursing skills. A sample consisting of military and civilian registered nurses (N=44) will be randomly assigned to participate in one of two different training methodologies – either PCSB simulation learning or HFS learning – for the selected trauma nursing functions (upper airway management, bleeding control, and cervical spine immobilization). Comparable training lesson plans have been developed for each trauma skill and the competency of each trainee will be evaluated pre-and post-training by an evaluator who is blinded with regards to the trainees' prior experience as a professional nurse, as well as the assigned method of training intervention. Cost benefit analysis will be conducted for each type of training method (PCSB and HFS). The project is being conducted at two research sites, namely: the University of Hawaii at Manoa (UHM), and the Tripler Army Medical Center (TAMC). There are two principle investigators (PI) on the project, one from the University of Hawaii (Dr. Kristine Qureshi) and one from the US Army (COL Denise Hopkins-Chadwick). The model developed will be useful for future research about the best methods for the use of simulation for teaching clinical skills to military and civilian clinicians. High fidelity simulation is an expensive method of training, therefore, it is important to understand the costs associated with different training methods relative to learning outcomes.

This is the annual report for year 2 of the project. During this period, significant delays were experienced while obtaining Institutional Review Board (IRB) and Cooperative Research and Development Agreement (CRADA) approvals. Note that CRADA approval from the Clinical Investigations Regulatory Office (CIRO) is still pending. The project timeline, tasks, and progress status can be seen as a summary view on the attached Gantt chart (Appendix A). The information below describes in greater detail the work that has been accomplished for each of the project tasks during this past year.

BODY:

Task 1. Organize the project

a. Manufacturer testing of the two SIM MAN 3G manikins obtained during year 1, resulted in the discovery of additional defects. The defect caused frequent situations where the manikin–computer interface signal would be randomly dropped, which resulted in frequent loss of the signal to the manikin. We had noticed this and were concerned this would negatively impact the training and testing and enter a confounder into the study. We worked with the Laerdal Company to have the defective parts replaced on both manikins (at no cost to the project). Arrangements were made to have a Laerdal engineer come to UHM and repair the manikin on August 8th, 2012.

Task 2. Begin IRB formal approval

a. IRB approvals for phase two were secured from UHM, TAMC, and the Human Research Protections Office (HRPO). (Appendix B)

b. Scientific Review Committee (SRC) approval was secured from TAMC.

c. CRADA approval from year 1 was secured from TAMC during year 2, and submitted to the Clinical Investigations Regulatory Office (CIRO) for approval. We will enter year 3 with CIRO approval still pending. We expect the final CIRO approvals to be secured by October 1, and plan to commence participant testing during October 2012.

Task 3. Develop simulation training programs

a. Following the success of the 2011 IMSH conference, one member from the research team attended the 2012 IMSH conference in San Diego, California and another member attended the 2012 Digital Media and Learning conference in San Francisco, California. These events continued to expand the team's peer network and not only inform them on new simulation practices, but also the latest in PC screen based learning.

b. All three of the PC screen based and high fidelity simulation scenarios, lesson plans, and detailed training tasks were developed (Appendix C and D). The PC screen based training modules were loaded on each of the training computers, and tested to ensure smooth and consistent functionality. The training modules are ready to be used.

Task 4. Develop evaluation strategies

a. The evaluation model, which includes the pre and post assessment to determine educational efficacy was completed. Each assessment item had been mapped to specific areas of knowledge, skills, and attitudes targeted by the instructional modules (Appendix E).

Task 5. Conduct of small pilot test and full scale pilot

a. This project has experienced a series of delays due mainly to the unforeseen length of time it takes to obtain approvals from the IRB, the SRC, and for the CRADA before proceeding with the research. Due to the unanticipated amount of time it has taken to obtain approvals for the IRB, the SRC and the CRADA, economies were made in the budget throughout the year in order to have adequate funds for a one year no-cost extension. A request for a no-cost extension and budget reallocation was submitted in August 2012 to extend the project for an additional year. Approval of the request was received on August 24, 2012. We expect the final approval from CIRO for the CRADA to be secured by October 1st from which point we can proceed with the research. We plan to conduct participant testing during October, and complete the first phase of training and assessment by the end of November 2012. The follow up assessment will be conducted during February 2013. Analysis of data will be

conducted during March and April of 2013, and dissemination activities will be executed during May through the end of the project on August 24, 2013. The aforementioned tasks and dates can be seen on the attached Gantt chart representing the no-cost extension (year 3) timeline (Appendix F).

KEY RESEARCH ACCOMPLISHMENTS:

This project is not in the phase for discovery of research findings. Outcomes will be reported during the final year of the project in the final report. During year two a poster presentation titled: "Creating an evaluation model for simulation learning" was presented at the Phyllis J. Verhonick Nursing Research Course, in San Antonio, TX. (Appendix G). The citation for the project did not contain all required information. The PI is aware that the acknowledgements to the poster are incorrect and ensures that the proper wording will appear on all subsequent publications.

REPORTABLE OUTCOMES:

- Second phase IRB approval from UH, TAMC, and HRPO
- CRADA approval from UH and TAMC. Approval from CIRO is still pending.
- Module content - PC screen based and high fidelity simulation scenarios and Detailed training tasks for each skill
    - C-Collar simulation algorithm
    - Upper Airway simulation algorithm
    - Acute Hemorrhage simulation algorithm
- Lesson plans for each training module completed
    - C-collar application
    - Upper Airway Respiratory Injury
    - Acute Hemorrhage control
- Evaluation model completed
    - Pre Training Assessment: Demographics, Knowledge and Attitudes
    - Pre and Post Training Assessment: Skills
    - Post Training Assessment and Program Evaluation

CONCLUSION:

This project has not yet obtained results that can be reported. Results will be summarized during the final report.

REFERENCES:

Not applicable

SUPPORTING DATA:

Not applicable

Appendices

Appendix A: Simulation learning PC screen-based vs. high fidelity – progress chart

Appendix B: Approved Protocol – Simulation Learning: PC-Screen Based (PCSB) versus High Fidelity Simulation (HFS) Part II Model Development

Appendix C: PC-Screen Based and High Fidelity Simulation Scenarios and detailed training task for each skill

Appendix D: Lesson plans for each training module

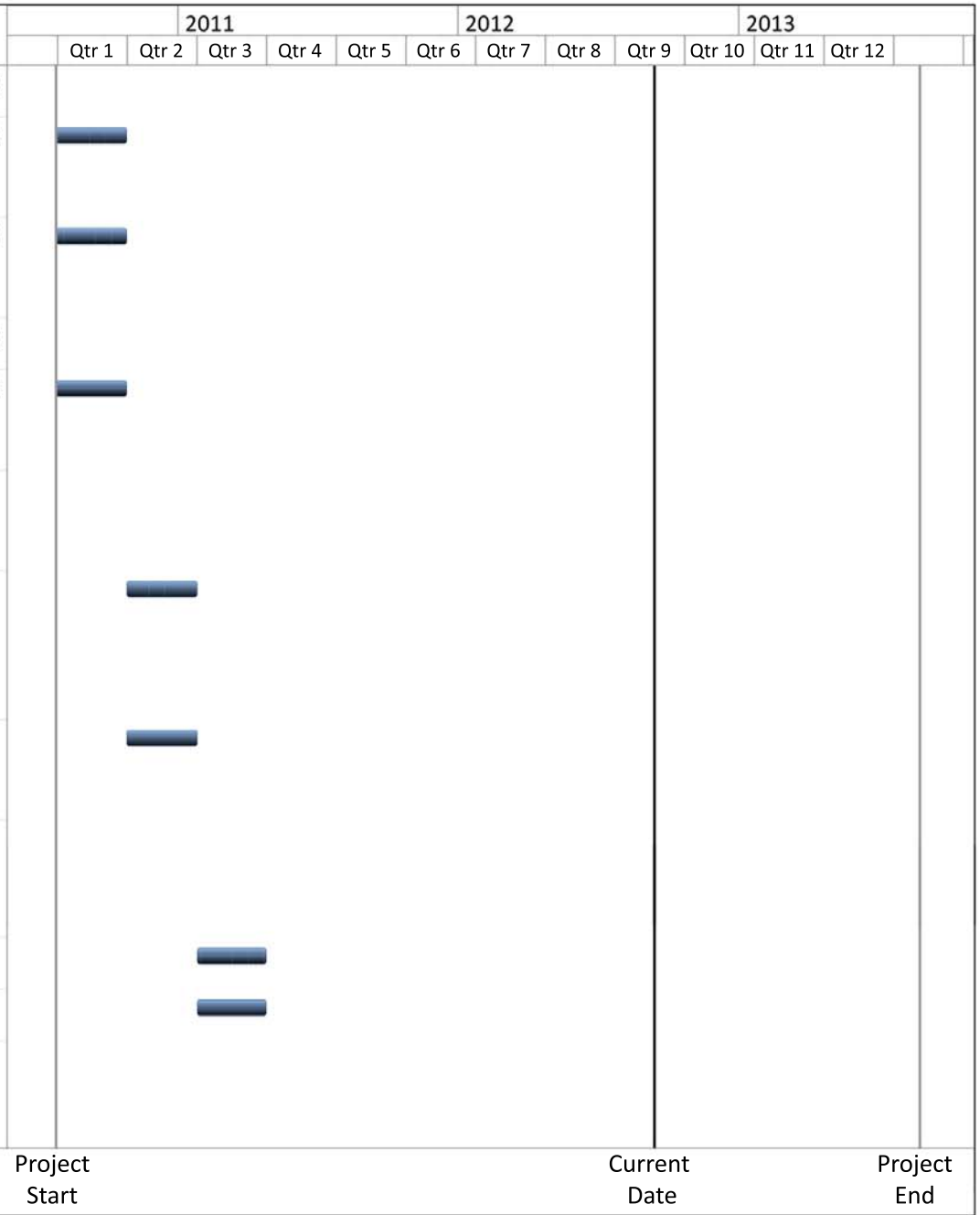
Appendix E: Evaluation model

Appendix F: Simulation learning PC screen-based vs high-fidelity – No cost extension progress chart

Appendix G: Abstract and poster “Creating an Evaluation Model for Simulation Learning”

Appendix A: Simulation learning PC screen-based vs high fidelity - progress chart

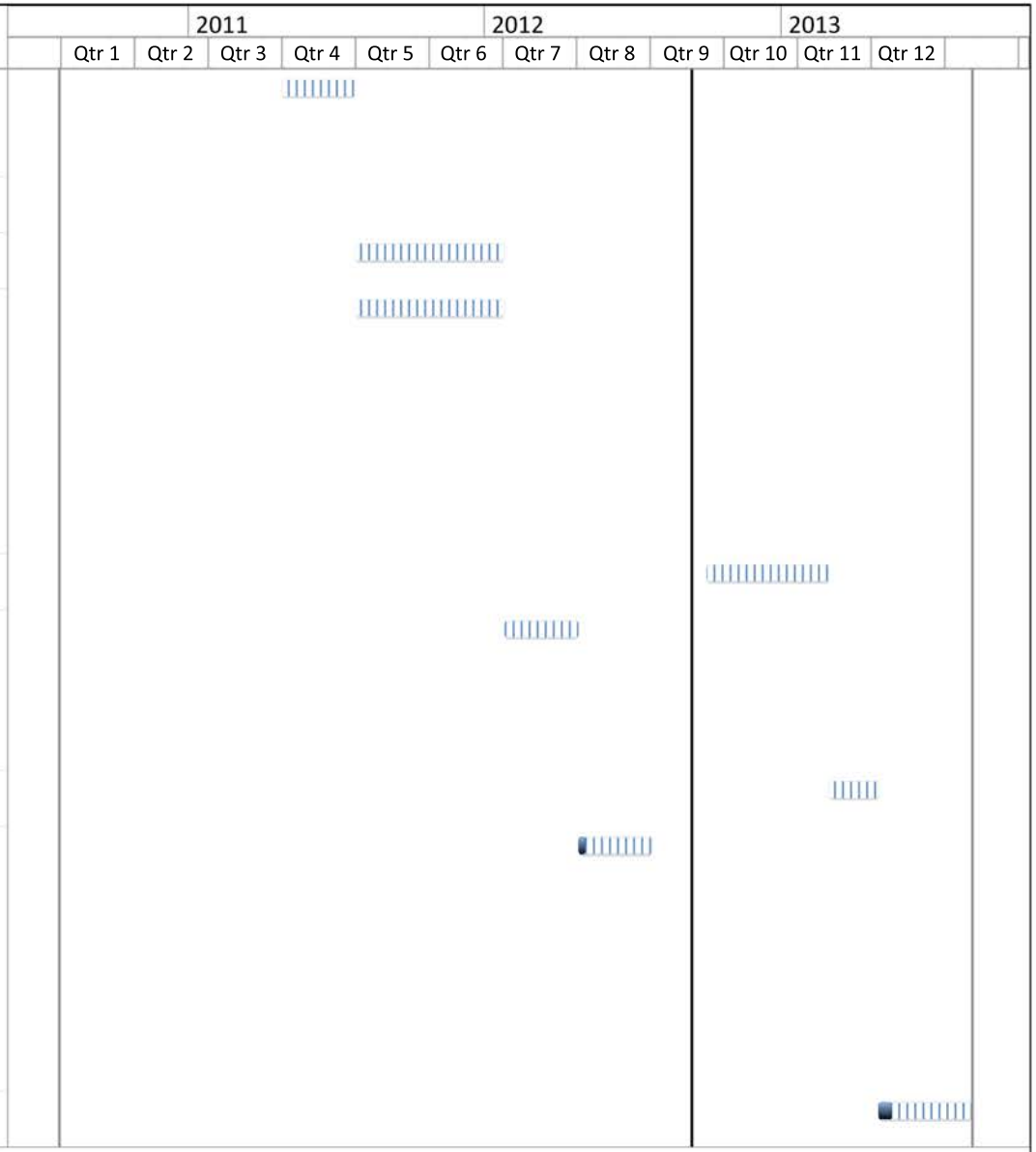
QTR	Task Name	% Comp	Proposed Start Date	Proposed End Date
1	**Organize the project**	**100%**	**Mon 7/26/10**	**Mon 10/25/10**
	- Schedule monthly meetings at each site & between sites	100%	Mon 7/26/10	Mon 10/25/10
	- Hire support personnel and procure equipment	100%	Mon 7/26/10	Mon 10/25/10
2	**Begin IRB formal approval**	**100%**	**Mon 7/26/10**	**Mon 10/25/10**
	- Develop and submit IRB approval documents for UH and TAMC	100%	Mon 7/26/10	Mon 10/25/10
2	**Develop simulation training programs**	**100%**	**Tue 10/26/10**	**Tue 1/25/11**
	- Identify existing program, develop and pilot test comparison program for alternative simulation method	100%	Tue 10/26/10	Tue 1/25/11
	- Site visit to USAMRMC Frederick, MD Simulation Center	100%	Tue 10/26/10	Tue 1/25/11
3	**Develop evaluation strategies (use what was learned at SC to shape the training and evaluation materials)**	**100%**	**Wed 1/26/11**	**Mon 4/25/11**
	- Educational effectiveness	100%	Wed 1/26/11	Mon 4/25/11
	- Cost benefit analysis	100%	Wed 1/26/11	Mon 4/25/11
4	**Small pilot test learning modules and evaluation & economic model (N=4), & revise as needed**	**0%**	**Tue 4/26/11**	**Mon 7/25/11**



Project: Simulation Learning PC Screen-Based vs. High Fidelity Project - Progress Chart
Date: Thu 9/13/12

Task work in progress Task work completed

QTR	Task Name	% Comp	Proposed Start Date	Proposed End Date
	- Focus group; pre and post tests, direct observation	0%	Tue 4/26/11	Mon 7/25/11
5 & 6	**Conduct full scale pilot**	**0%**	**Tue 7/26/11**	**Wed 1/25/12**
	- Conduct power analysis	0%	Tue 7/26/11	Wed 1/25/12
	- Recruit participants, (anticipated N=40); conduct pre- and post-training competency evaluation, and apply economic analysis model	0%	Tue 7/26/11	Wed 1/25/12
	No Cost Extension Timeline	0%	Mon 10/1/12	Thu 2/28/13
7	**Data Analysis: analyze data for educational and cost benefit outcomes**	**0%**	**Thu 1/26/12**	**Wed 4/25/12**
	No Cost Extension Timeline	0%	Fri 3/1/13	Tue 4/30/13
8	**Disseminate findings: submit publications; present at progressional conferences (e.g. Annual Asia Pacific Military Medicine Conference)**	**10%**	**Thu 4/26/12**	**Wed 7/25/12**
	No Cost Extension Timeline	15%	Wed 5/1/13	Sat 8/24/13



Project: Simulation Learning PC Screen-Based vs. High Fidelity Project - Progress Chart
Date: Thu 9/13/12

Task work in progress Task work completed

Appendix B. Approved Protocol – Simulation Learning: PC-Screen Based (PCSB) versus High Fidelity Simulation (HFS) Part II Model Development

Office of Research Compliance
Human Studies Program

UNIVERSITY of HAWAI'I MĀNOA

May 4, 2012

TO: Kristine Qureshi, RN
Principal Investigator
Nursing

FROM: Ching Yuan Hu, PhD
Interim Director
Human Studies Program
Office of Research Compliance
University of Hawaii, Manoa

Re: CHS #20151- "Simulation Learning: PC- Screen Based (PCSB) Versus High Fidelity Simulation (HFS) Part II Model Development"

This letter is your record of the Human Studies Program approval of this study as exempt.

On May 4, 2012, the University of Hawai'i (UH) Human Studies Program approved this study as exempt from federal regulations pertaining to the protection of human research participants. The authority for the exemption applicable to your study is documented in the Code of Federal Regulations at 45 CRF 46 (2).

Exempt studies are subject to the ethical principles articulated in The Belmont Report, found at http://www.hawaii.edu/irb/html/manual/appendices/A/belmont.html

Exempt studies do not require regular continuing review by the Human Studies Program. However, if you propose to modify your study, you must receive approval from the Human Studies Program prior to implementing any changes. You can submit your proposed changes via email at uhirb@hawaii.edu. (The subject line should read: Exempt Study Modification.) The Human Studies Program may review the exempt status at that time and request an application for approval as non-exempt research.

In order to protect the confidentiality of research participants, we encourage you to destroy private information which can be linked to the identities of individuals as soon as it is reasonable to do so. Signed consent forms, as applicable to your study, should be maintained for at least the duration of your project.

This approval does not expire. However, please notify the Human Studies Program when your study is complete. Upon notification, we will close our files pertaining to your study.

If you have any questions relating to the protection of human research participants, please contact the Human Studies Program at 956-5007 or uhirb@hawaii.edu. We wish you success in carrying out your research project.

1960 East-West Road
Biomedical Sciences Building B104
Honolulu, Hawai'i 96822
Telephone: (808) 956-5007
Fax: (808) 956-8683

MCHK-CI 3 April 2012

MEMORANDUM FOR Judy Carlson, RN, Ed.D. Department of Nursing, (ATTN: MCHK-NS), Tripler AMC, HI

SUBJECT: Approval to Initiate No Greater Than Minimal Risk Study

1. Your clinical investigation protocol entitled "Simulation Learning: PC-Screen Based (PCSB) versus High Fidelity Simulation (HFS) Part 2 Model Development" was reviewed and approved through expedited review procedures as No Greater Than Minimal Risk under provisions of 32CFR219.110 by the Chair of the Institutional Review Board (IRB) at Tripler Army Medical Center (TAMC) on 2 April 2012. The protocol is approved for a period of 3 April 2012 through 2 April 2013. The study has been assigned **TAMC Prototocl Number 31H12**. You may only begin research work related to this protocol that is not dependent upon a Cooperative Research and Development Agreement/Statement of Work (CRADA/SOW). For the research activity that is CRADA/SOW dependent, a separate CRADA/SOW approval letter is required prior to commencement.

2. The protocol will expire on 2 April 2013 and must be re-approved by the IRB before that date. You will be notified to submit a Continuing Review Report for your study through IRBNet using the DMRN Continuing Review Report. The Continuing Review Report will serve as an application for re-approval by the IRB, and so must be turned in no later than 6 weeks before the date of expiration.

3. You are approved to enroll **up to 44** subjects into the study. You may not exceed this number without ***prior*** approval. Subjects that enroll but withdraw from participation are considered in the total number of subjects. The official informed consent documents and HIPAA authorization for use in this study are enclosed and affixed with the TAMC IRB stamp dated 3 April 2012 with the expiration date 2 Apirl 2013 for duplication and enrollment of study subjects.

4. The principal investigator must ***promptly*** report any serious or unexpected adverse reactions to drugs or procedures to the IRB. Any study-related serious unexpected adverse events must be reported to the Chief, Department of Clinical Investigation (DCI), Human Protections Administrator, and to the Chair, Human Use Committee **within 24 hours** after the investigator becomes aware of the event. The initial report should be followed by a full written report to the DCI Research Review Office no later than 10 business days after the investigator becomes aware of the event. 21 CFR 312.32 defines a serious adverse event or suspected adverse reaction as one that results in: (a) death, (b) persistent or significant disability or incapacity, (c) life-threatening situation, (d) inpatient or prolonged hospitalization, or (e) congenital anomaly/birth defect in an offspring, or (f) an important medical event that, based upon appropriate medical judgment may jeopardize the patient or paricipant and may require medical or surgical intervention to prevent one of the outcomes listed above.

You should retain this letter as part of this protocol's record.

MCHK-CI
SUBJECT: Approval of Study Initiation

5. Approval is granted with the understanding that no further changes or additions will be made to the procedures followed, investigators involved, or to the informed consent document(s) used without the knowledge and approval of the IRB. Changes include, but not limited to, modifications in study design, recruitment process and number of subjects.

6. You are required to keep all signed subject informed consent documents in a permanent file in an area designated for that purpose that is accessible to your chain of command and inspectors of official audit agencies. Your study and its documentation, including the executed informed consent documents, are subject to inspection at any time. You must maintain your records to facilitate such inspections. Upon completion of the study, you should report this to the Department of Clinical Investigation.

7. Please note that this is ***not*** an approval to receive extramural resources (i.e., personnel, drugs, supplies, equipment, money, and gifts from any source outside of TAMC) nor an indication of guaranteed funding from the Department of Clinical Investigation. You must coordinate extramural resource approvals with the Department of Clinical Investigation, Bldg. 40, 433-6709. If any extramural resources are received without DA or MEDCOM approval, the individual who receives them may be found in ethics violation and prosecuted for criminal misconduct.

8. All manuscripts, abstracts, or publicly-released information related to research conducted at or sponsored by TAMC must be submitted for approval as stated in TAMC Pamphlet 40-31 ***prior*** to submission for public release or publication. This includes oral presentations or posters, manuscripts, review articles, case reports, abstracts and interviews.

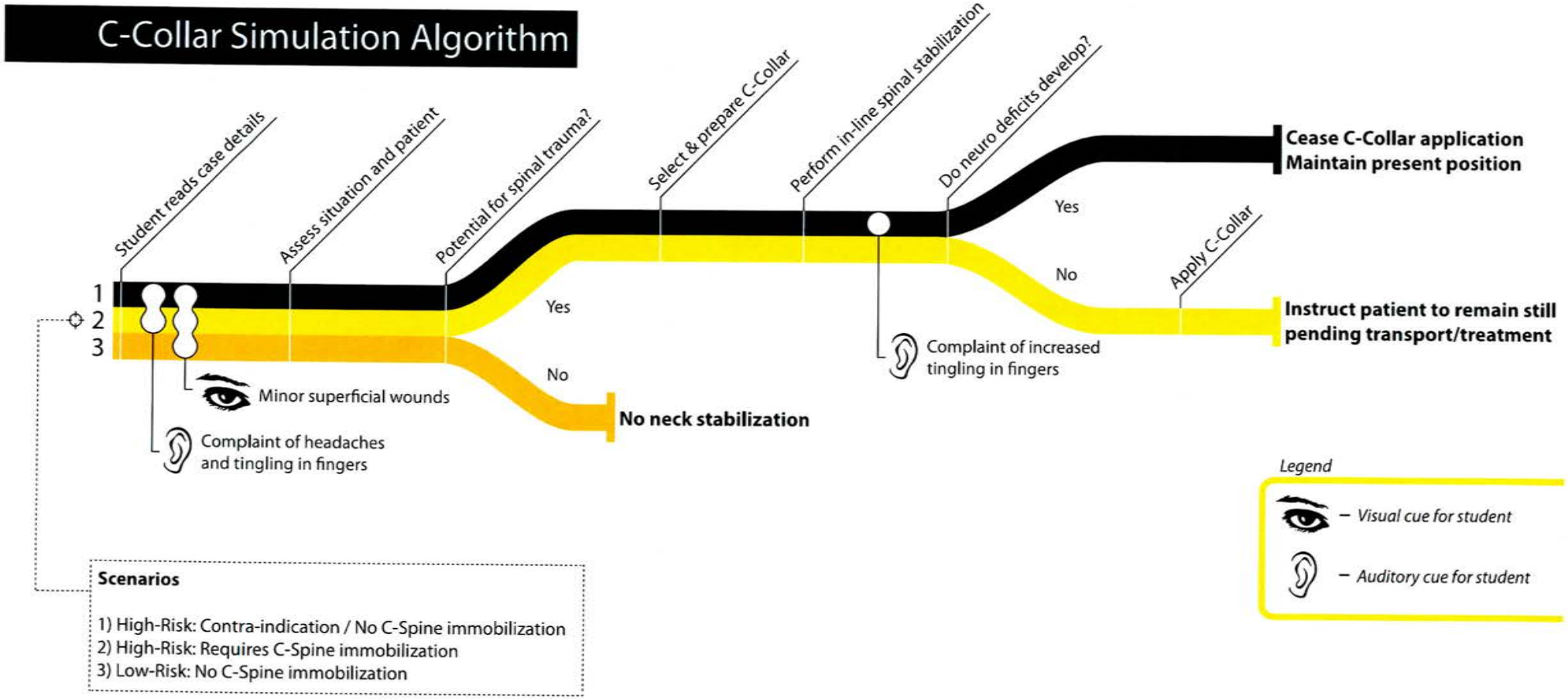
9. Your research study has been determined to be of potential importance to the academic and professional program of Tripler AMC. You are to give all possible priority to its completion. Should any problem arise that jeopardizes the success of your research, please notify the undersigned at 433-7171.

Encl

KEVIN M. LIN-HURTUBISE, M.D.
Chair, Institutional Review Board

You should retain this letter as part of this protocol's record.

Appendix C: PC-Screen Based and High Fidelity Simulation Scenarios and detailed training task for each skill



This project is supported by the US Department of Defense, TeleMedicine, and Advanced Technology Research Center (TATRC)
#W81XWH-10-2-0061

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University of Hawai`i at Mānoa

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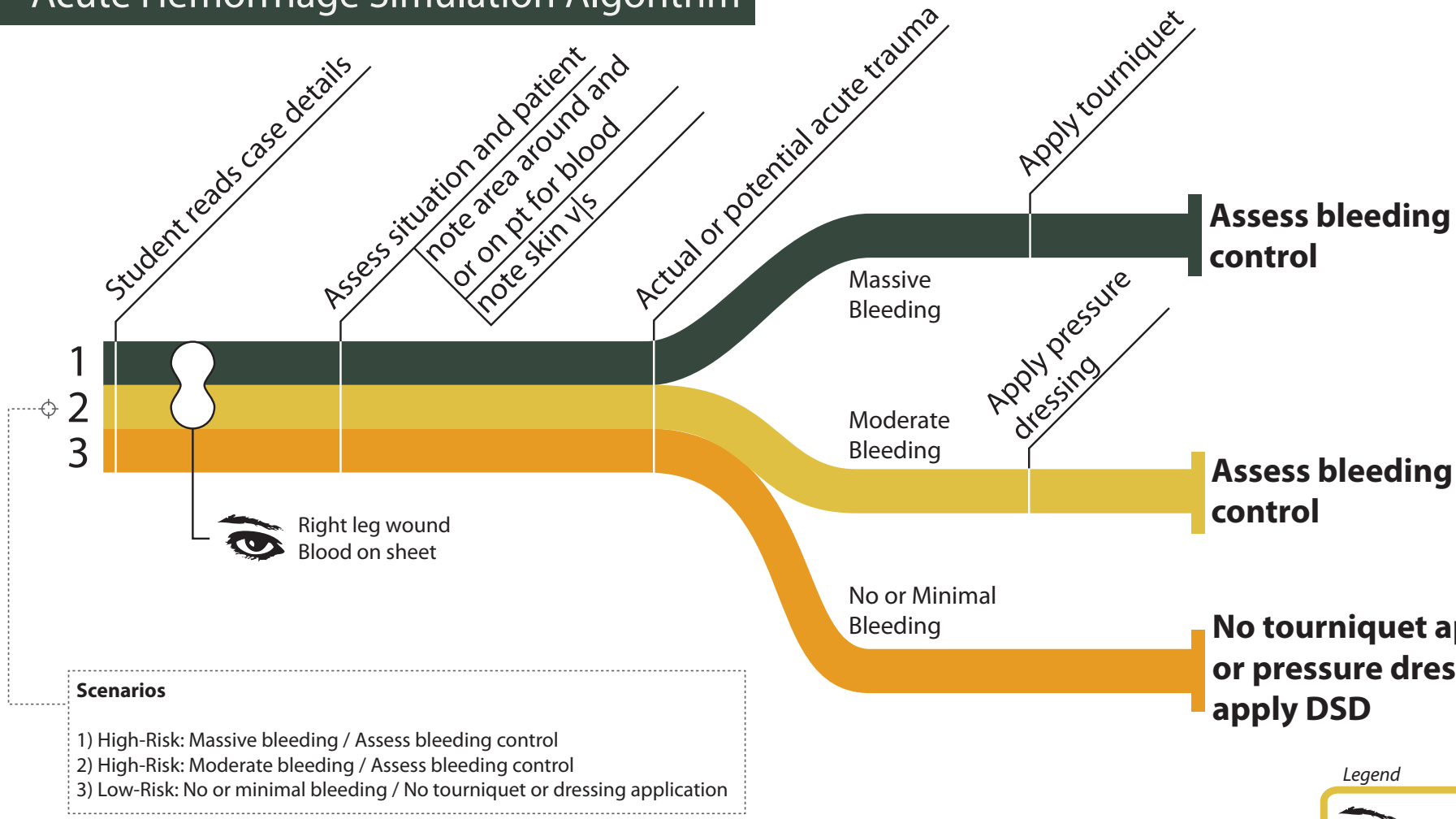
Acute Hemorrhage Simulation Algorithm



Scenarios

1) High-Risk: Massive bleeding / Assess bleeding control
2) High-Risk: Moderate bleeding / Assess bleeding control
3) Low-Risk: No or minimal bleeding / No tourniquet or dressing application

Legend

– *Visual cue for student*

– *Auditory cue for student*

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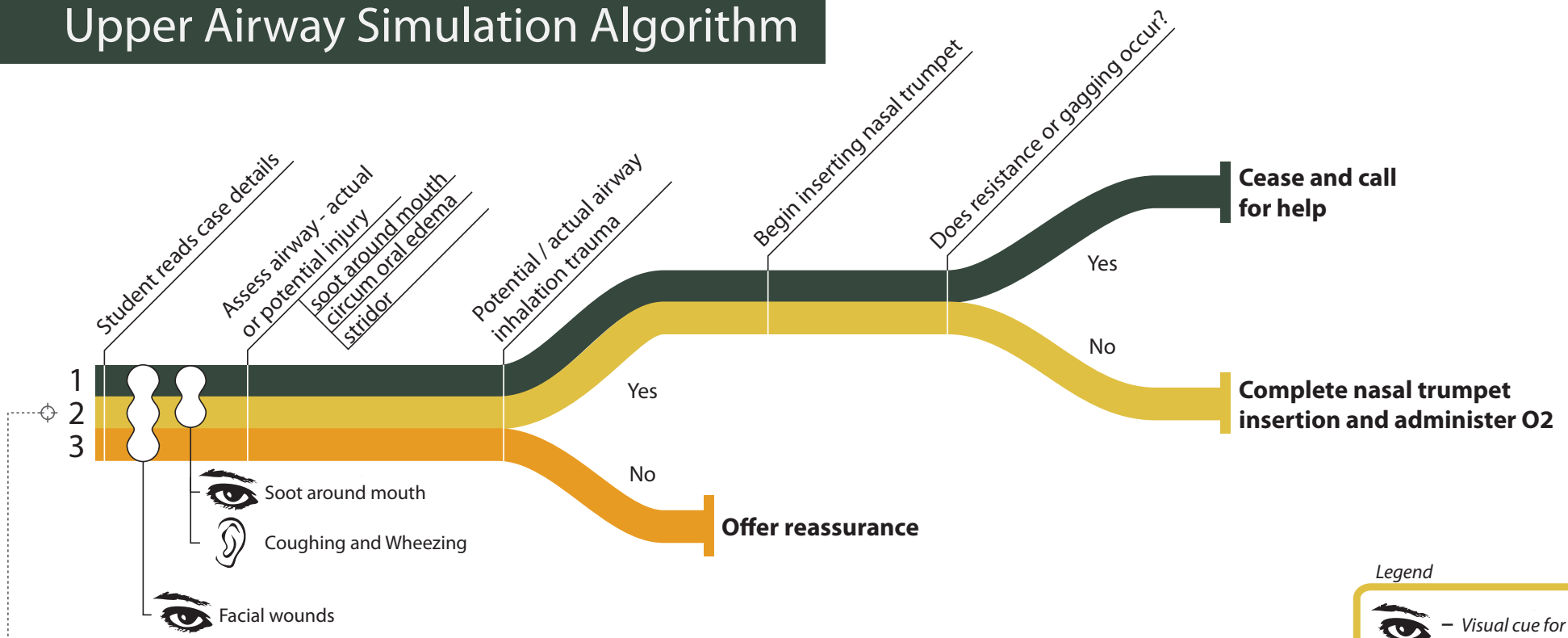
Upper Airway Simulation Algorithm



Scenarios

1) High-Risk: Potential or actual trauma / Resistance occurs
2) High-Risk: Potential or actual trauma / Resistance does not occur
3) Low-Risk: No potential or actual trauma

Legend

– *Visual cue for student*

– *Auditory cue for student*

This project is supported by the US Department of Defense, TeleMedicine, and Advanced Technology Research Center (TATRC)
#W81XWH-10-2-0061

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Appendix D: Lesson plans for each training module

Simulation Lesson Plan Outline - C-collar Application (60 min)

Scenario

Marine SGT Mapu is a 24 year old Samoan male who fell 20ft from an obstacle course climbing tower during training this morning. He landed on the grass surface below. He was alert and oriented at the scene, and did not lose consciousness. His training buddies put him in the back of a pick-up truck and drove him to the emergency department. Immediate triage vital signs done by the intake medic are 132/82, HR 94, RR 28, O2 Sat 94% on room air. Intake medic put him on a gurney because he was complaining of being light-headed from not eating breakfast.

Background

Marine SGT Mapu is assigned to the Marine Corps Base in Kaneohe. He is married and has 1 son (4yo).
PMH: healthy male, history of fracture on the right humerus playing rugby in high-school. No known allergies.
Last medical clinic VS: 120/78, HR 64, RR 18, T 98, O2 Sat 95%
Medications: no prescription medications and no history of recreational drug or alcohol use.

Student Learning Objectives

- Recognize potential need for C-spine immobilization
- Make an appropriate decision to initiate C-collar application
- Make an appropriate decision to continue C-collar application or cease C-collar application
- Use correct technique for C-collar application: C-collar size, placement on body, tightness

***note** – Information in *italics* denotes rationale for teaching methods

Topics	Content Summary	HF-SIM	PCSB	Time
Assessment / Pre-test	Knowledge, Skills, & Attitudes / Sense of self efficacy	1) Identification of indications or contra indications to apply a C-collar 2) Selection of an appropriate C-collar size 3) Correct application of C-collar 4) Initiates continuation of care upon completion of C-collar application	1) Identification of indications or contra indications to apply a C-collar 2) Selection of an appropriate C-collar size 3) Correct application of C-collar 4) Initiates continuation of care upon completion of C-collar application	15 min

Topics	Content Summary	HF-SIM	PCSB	Time	Faculty
Introduction to C-spine injuries, their importance, and their relevance to nurses.	C-spine anatomy and consequences of C-spine fracture or dislocation. C-spine injury can result in a fracture or dislocation to the spinal cord that results in paralysis or death. **Stimulating recall of prior learning/events facilitates the learning process. It is easier for learners to store information they can link to personal experiences and knowledge.*	PowerPoint lecture followed by class discussion on any prior experiences with C-collar application and spinal trauma.	PowerPoint presentation with instructor audio followed by the learner typing in any prior experiences with C-collar application and spinal trauma into a textbox.	5 min	Dr. Kristine Qureshi
Overview of decisions to apply, interrupt, or not apply C-collar.	Summarize process of C-collar application. 1) Recognize potential for C-spine injury (If there is potential then immobilize the spine) 2) Select size and prepare C-collar for application	PowerPoint lecture briefly explaining major steps of C-collar application. In-class demonstration of C-collar application.	PowerPoint presentation with instructor audio briefly explaining major steps of C-collar application. Video demonstration with instructor audio of C-collar application.	5 min	Dr. Kristine Qureshi

	3) Perform in-line spinal stabilization 4) Apply C-collar 5) Initiate continuation of care Summarize reasons to refrain from or cease C-collar application. Demonstrate process of C-collar application. **The most effective way of teaching a whole problem is to demonstrate an instance of the problem first then cover the skills involved. For example, if are teaching about what a car is we start with the car as a whole, and then discuss what the pieces do (ex: brakes).*				
Spinal trauma indicators for C-collar application.	Mechanism of injury: • Fall > 15ft • Whiplash injury	PowerPoint lecture explaining spinal trauma indicators for C-collar application.	PowerPoint presentation with instructor audio explaining spinal trauma indicators for C-collar application.	3 min	Dr. Kristine Qureshi

	Symptoms • Numbness or tingling in extremities • Report of hearing or feeling a snap in neck				
C-collar sizes, styles, size measurement, and selection.	Review C-collar sizes and styles. Explain how to measure patient for correct size of C-collar, and select appropriate C-collar. Explain how to setup C-collar before application.	Instructor demonstration of C-collar sizes and styles. Instructor demonstration on measuring correct C-collar size, selecting appropriate C-collar, and setting up C-collar prior to application. Short student practice of measuring appropriate C-collar size, selecting appropriate C-collar, and setting up C-collar prior to application.	Video demonstration with instructor audio of C-collar sizes and styles. Video demonstration with instructor audio of measuring correct C-collar size, selecting appropriate C-collar, and setting up C-collar prior to application. Student practices on an interactive video that pauses and allows the learner to select appropriate actions. Student receives feedback after each selection then continues through the video until the next action must be performed.	5 min	Dr. Kristine Qureshi
Performing in-line spinal stabilization of neck for C-collar application.	Explain the process of placing head and neck in alignment for C-collar application.	Instructor demonstration of performing in-line stabilization of neck for C-collar application. Short student practice on	Video demonstration with instructor audio on performing in-line stabilization of neck for C-collar application	4 min	Dr. Kristine Qureshi

		performing in-line stabilization of neck for C-collar application.	Student practices on an interactive video that pauses and allows the learner to select appropriate actions. Student receives feedback after each selection then continues through the video until the next action must be performed.		
How to apply a C-collar.	Process of C-collar application. Important concerns during C-collar application: 1) No jarring of patient 2) Correct chin/neck placement 3) Proper fit & size verification After applying C-collar immobilize head with tape to backboard or bed. Place patient on side if they begin to vomit. Keep C-collar in place and body aligned.	Instructor demonstration on applying a C-collar with examples (ex: not jarring patient) and non-examples (ex: jarring patient) of important concerns. Short student practice on applying a C-collar.	Video demonstration with instructor audio of C-collar application with examples (ex: not jarring patient) and non-examples (ex: jarring patient) of important concerns. Student practices on an interactive video that pauses and allows the learner to select appropriate actions. Student receives feedback after each selection then continues through the video until the next action must be performed.	5 min	Dr. Kristine Qureshi
Situations to cease C-collar	When tingling in extremities increases	PowerPoint lecture of situations to cease C-collar application.	Video presentation with instructor audio of situations	3 min	Dr. Kristine Qureshi

application.	during C-collar application. When airway obstruction occurs during C-collar application.		to cease C-collar application.		
Review of decisions to apply, interrupt, or not apply C-collar.	Summarize process of C-collar application. 1) Recognize potential for C-spine injury (If there is potential then immobilize the spine) 2) Select size and prepare C-collar for application 3) Perform in-line spinal stabilization 4) Apply C-collar 5) Initiate continuation of care Summarize reasons to refrain from or cease C-collar application. Demonstrate process of C-collar application.	PowerPoint lecture briefly summarizing C-collar application. Student practices full C-collar application process.	Video presentation with instructor audio briefly summarizing C-collar application. Student practices on an interactive video that pauses and allows the learner to select appropriate actions. Student receives feedback after each selection then continues through the video until the next action must be performed. **(Can be repeated multiple times)**	5 min	Dr. Kristine Qureshi

Topics	Content Summary	HF-SIM	PCSB	Time
Assessment / Post-test	Knowledge, Skills, & Attitudes / Sense of self efficacy	1) Identification of indications or contra indications to apply a C-collar 2) Selection of an appropriate C-collar size 3) Correct application of C-collar 4) Initiates continuation of care upon completion of C-collar application	1) Identification of indications or contra indications to apply a C-collar 2) Selection of an appropriate C-collar size 3) Correct application of C-collar 4) Initiates continuation of care upon completion of C-collar application	10 min

Simulation Lesson Plan Outline – Acute Hemorrhage Control (60 min)

Scenario
Right leg acute vascular hemorrhage

Background

Student Learning Objectives

- Recognize actual or potential trauma
- Classify severity of hemorrhage
- Correctly apply a combat application tourniquet
- Correctly assess bleeding control

***note –** Information in *italics* denotes rationale for teaching methods

Topics	Content Summary	HF-SIM	PCSB	Time
Assessment / Pre-test	Knowledge, Skills, & Attitudes / Sense of self efficacy	1) Identification of indications or contra indications for acute hemorrhage control 2) Correctly classify severity of hemorrhage 3) Correct application of combat application tourniquet 4) Correctly assess bleeding control	1) Identification of indications or contra indications for acute hemorrhage control 2) Correctly classify severity of hemorrhage 3) Correct application of combat application tourniquet 4) Correctly assess bleeding control	15 min

Topics	Content Summary	HF-SIM	PCSB	Time	Faculty
Introduction to acute hemorrhage control, its importance, and its relevance to nurses.	What is acute hemorrhage? What are the results of acute hemorrhage? The #1 priority is to stop the flow of blood! **Stimulating recall of prior learning/events facilitates the learning process. It is easier for learners to store information they can link to personal experiences and knowledge.*	PowerPoint lecture followed by class discussion on any prior experiences with acute hemorrhage control.	PowerPoint presentation with instructor audio followed by the learner typing in any prior experiences with acute hemorrhage control into a textbox.	5 min	Dr. Kristine Qureshi
Overview of decisions to identify, apply, or not apply acute hemorrhage control.	Summarize process of acute hemorrhage control. 1) Assessing for actual or potential acute trauma 2) Applying a combat application tourniquet	PowerPoint lecture briefly explaining major steps of acute hemorrhage control. In-class demonstration of acute hemorrhage control.	PowerPoint presentation with instructor audio briefly explaining major steps of acute hemorrhage control. Video demonstration with instructor audio of acute hemorrhage control.	5 min	Dr. Kristine Qureshi

	3) Assessing bleeding control after applying a combat application tourniquet **The most effective way of teaching a whole problem is to demonstrate an instance of the problem first then cover the skills involved. For example, if are teaching about what a car is we start with the car as a whole, and then discuss what the pieces do (ex: brakes).*				
Assessing for actual or potential acute trauma	Explain how to classify hemorrhage as massive, moderate, or minimal bleeding. Discussion of vital signs and skin indicators present during acute hemorrhage.	PowerPoint lecture on how to assess for actual or potential acute trauma. In-class demonstration of actual or potential acute trauma assessment. Short student practice on assessing for actual or potential acute trauma.	PowerPoint presentation with instructor audio explaining assessment for actual or potential acute trauma. Video demonstration with instructor audio of assessment for actual or potential acute trauma. Student practices on an interactive video that pauses	5 min	Dr. Kristine Qureshi

			and allows the learner to select appropriate actions. Student receives feedback after each selection then continues through the video until the next action must be performed.		
How to apply a combat application tourniquet.	Explain steps for applying a combat application tourniquet 1) Place combat application tourniquet around the wounded leg 2) Pull Velcro strap through the buckle 3) Tighten Velcro strap until tourniquet is snug around the leg 4) Twist tourniquet rod to tighten 5) Secure rod with Velcro strap	Instructor demonstration of applying a combat application tourniquet. Short student practice of applying a combat application tourniquet.	Video demonstration with instructor audio on applying a combat application tourniquet. Student practices on an interactive video that pauses and allows the learner to select appropriate actions. Student receives feedback after each selection then continues through the video until the next action must be performed.	10 min	Dr. Kristine Qureshi
How to assess bleeding control.	Examine for cessation of blood flow.	Instructor demonstration on how to assess bleeding control. Short student practice on assessing bleeding control.	Video demonstration with instructor audio on assessing bleeding control. Student practices on an interactive video that pauses and allows the learner to	5 min	Dr. Kristine Qureshi

			select appropriate actions. Student receives feedback after each selection then continues through the video until the next action must be performed.		
Review of decisions to identify, apply, or not apply acute hemorrhage control.	Summarize process of acute hemorrhage control. 1) Assessing for actual or potential acute trauma 2) Applying a combat application tourniquet 3) Assessing bleeding control after applying a combat application tourniquet	PowerPoint lecture briefly summarizing acute hemorrhage control. Student practices full process of acute hemorrhage control.	Video presentation with instructor audio briefly summarizing acute hemorrhage control. Student practices on an interactive video that pauses and allows the learner to select appropriate actions. Student receives feedback after each selection then continues through the video until the next action must be performed. **(Can be repeated multiple times)**	5 min	Dr. Kristine Qureshi

Topics	Content Summary	HF-SIM	PCSB	Time
Assessment / Pre-test	Knowledge, Skills, & Attitudes / Sense of self efficacy	1) Identification of indications or contra indications for acute hemorrhage control 2) Correctly classify severity of hemorrhage 3) Correct application of CAT 4) Correctly assess bleeding control	1) Identification of indications or contra indications for acute hemorrhage control 2) Correctly classify severity of hemorrhage 3) Correct application of CAT 4) Correctly assess bleeding control	10 min

Simulation Lesson Plan Outline – Upper Airway Respiratory Injury (60 min)

Scenario

Background

Student Learning Objectives

- Recognize potential for upper airway respiratory injury
- Select correct size of nasal trumpet
- Correctly insert nasal trumpet into upper airway
- Correctly orient nasal trumpet after insertion and apply O2

***note –** Information in *italics* denotes rationale for teaching methods

Topics	Content Summary	HF-SIM	PCSB	Time
Assessment / Pre-test	Knowledge, Skills, & Attitudes / Sense of self efficacy	1) Identification of indications or contra indications for upper airway respiratory injury 2) Select appropriately sized nasal trumpet for patient 3) Correctly insert nasal trumpet into upper airway 4) Place nasal trumpet in correct final orientation and apply O2	1) Identification of indications or contra indications for upper airway respiratory injury 2) Select appropriately sized nasal trumpet for patient 3) Correctly insert nasal trumpet into upper airway 4) Place nasal trumpet in correct final orientation and apply O2	15 min

Topics	Content Summary	HF-SIM	PCSB	Time	Faculty
Introduction to upper airway inhalation injuries, its importance, and its relevance to nurses.	Upper airway inhalation consequences: 1) Direct damage to respiratory tract tissue 2) Inflammation of upper airway structures Can result in obstruction of upper airway. **Stimulating recall of prior learning/events facilitates the learning process. It is easier for learners to store information they can link to personal experiences and knowledge.*	PowerPoint lecture followed by class discussion on any prior experiences with upper airway inhalation injuries and nasal trumpet insertion.	PowerPoint presentation with instructor audio followed by the learner typing in any prior experiences with upper airway inhalation injuries and nasal trumpet insertion into a textbox.	5 min	Dr. Kristine Qureshi
Overview of decisions to identify upper airway inhalation injuries and to apply, or not apply a nasal trumpet.	Summarize process of intervention for upper airway inhalation injuries. 1) Assess airway for actual or potential injury	PowerPoint lecture briefly explaining major steps in identifying and intervening in upper airway inhalation injuries. In-class demonstration of identifying and intervening in upper airway inhalation injuries.	PowerPoint presentation with instructor audio briefly explaining major steps in identifying and intervening in upper airway inhalation injuries. Video demonstration with	5 min	Dr. Kristine Qureshi

	2) Measure, select, and begin inserting a nasal trumpet 3) What to do if resistance occurs 4) Completing nasal trumpet insertion and administration of O2 **The most effective way of teaching a whole problem is to demonstrate an instance of the problem first then cover the skills involved. For example, if are teaching about what a car is we start with the car as a whole, and then discuss what the pieces do (ex: brakes).*		instructor audio of identifying and intervening in upper airway inhalation injuries.		
How to assess an upper airway for actual or potential injury.	Signs of upper airway / inhalation injury: • History of smoke, chemical or extreme heat exposure	PowerPoint lecture on assessing an airway for actual or potential injury. In-class demonstration of assessing an upper airway for actual or potential injury.	PowerPoint presentation with instructor audio on assessing an airway for actual or potential injury. Video demonstration with instructor audio on assessing an upper airway for actual or	5 min	Dr. Kristine Qureshi

	• Soot around or in mouth, nose, and/or nasal pharynx • Visible edema or swelling of upper airway tissues • Symptoms of strider	Short student practice on assessing an upper airway for actual or potential injury.	potential injury. Student practices on an interactive video that pauses and allows the learner to select appropriate actions. Student receives feedback after each selection then continues through the video until the next action must be performed.		
Selecting and beginning insertion of a nasal trumpet.	Demonstrate nasal trumpet sizes.Show how to measure patient for appropriate nasal trumpet size. Explain how to insert nasal trumpet. 1) Lubricate tube with water or water soluble lubricant 2) Place tube in nasal nare with bevel facing septum 3) Begin advancing trumpet with slight rotation towards ear	In-class demonstration of measuring, selecting, and beginning the insertion of a nasal trumpet. Short student practice on measuring, selecting, and beginning the insertion of a nasal trumpet	Video demonstration with instructor audio of measuring, selecting, and beginning the insertion of a nasal trumpet. Student practices on an interactive video that pauses and allows the learner to select appropriate actions. Student receives feedback after each selection then continues through the video until the next action must be performed.	5 min	Dr. Kristine Qureshi
How to identify resistance during nasal trumpet insertion, and appropriate	Explanation of what causes resistance, and why insertion should be halted.	PowerPoint lecture on identifying resistance to nasal trumpet insertion and appropriate responses.	PowerPoint presentation with instructor audio on identifying resistance to nasal trumpet insertion and appropriate responses.	5 min	Dr. Kristine Qureshi

responses.	What to do when resistance occurs.				
How to complete nasal trumpet insertion.	Final rotation of nasal trumpet after complete insertion: Rotate trumpet so curvature of trumpet matches curvature of nasal pharynx and bevel is facing posterior. Why and how to administer O2 after nasal trumpet is inserted.	In-class demonstration of completing nasal trumpet insertion and O2 administration. Short student practice on completing nasal trumpet insertion and O2 administration.	Video demonstration with instructor audio of completing nasal trumpet insertion and O2 administration. Student practices on an interactive video that pauses and allows the learner to select appropriate actions. Student receives feedback after each selection then continues through the video until the next action must be performed.	5 min	Dr. Kristine Qureshi
Review of decisions to identify upper airway inhalation injuries and to apply, or not apply a nasal trumpet.	Summarize process of intervention for upper airway inhalation injuries. 1) Assess airway for actual or potential injury 2) Measure, select, and begin inserting a nasal trumpet 3) What to do if resistance occurs 4) Completing nasal trumpet insertion and administration of O2	PowerPoint lecture briefly summarizing intervention for upper airway inhalation injuries. Student practices full process of intervention for upper airway inhalation injuries.	Video presentation with instructor audio briefly summarizing intervention for upper airway inhalation injuries. Student practices on an interactive video that pauses and allows the learner to select appropriate actions. Student receives feedback after each selection then continues through the video until the next action must be performed. **(Can be repeated multiple times)**	5 min	Dr. Kristine Qureshi

Topics	Content Summary	HF-SIM	PCSB	Time
Assessment / Pre-test	Knowledge, Skills, & Attitudes / Sense of self efficacy	1) Identification of indications or contra indications for upper airway respiratory injury 2) Select appropriately sized nasal trumpet for patient 3) Correctly insert nasal trumpet into upper airway 4) Place nasal trumpet in correct final orientation and apply O2	1) Identification of indications or contra indications for upper airway respiratory injury 2) Select appropriately sized nasal trumpet for patient 3) Correctly insert nasal trumpet into upper airway 4) Place nasal trumpet in correct final orientation and apply O2	10 min

Simulation Learning: PC-Screen Based (PCSB) versus High Fidelity Simulation (HFS).
Version #1 Date: 1 February 2012

Appendix 4 – Pre- Training Assessment

Tripler Army Medical Center and the University of Hawaii at Manoa

Simulation Study: Development of a Model to Compare of PC Screen Based and High Fidelity Simulation Instruction of Trauma Nursing Skills

Pre Training Assessment Tool

Participant secret code: _____

Introduction: This is a study to develop a model that can be used to compare PC screen based with high fidelity simulation learning. All procedures should have been reviewed with you during the information and consent process. If you have any questions, please feel free to ask them. There are three parts to your involvement. First: pre training assessment, second: training (via either PC Screen training or high fidelity simulation training) and lastly post training assessment. This is the pre training assessment portion. At this point In time you are being asked to complete the pre training assessment which includes:

1. We will give you a secret code for yourself, which will include both letters and numbers. You will be asked to enter this code on each of the forms that are used in all portions of the pre and post assessment evaluation activities. This will allow us to match the pre and post assessment data without identifying who you are. Now enter this code on the top of this form in the *participant secret code section.*
2. Read the pre- assessment questions and enter your answer for each item. When you are completed, please place this form in the envelope provided and seal it, and give it to the research assistant.

Demographic information

1. **Gender:** Male___ Female___ **2. Age in years:** ___
3. **What type of nurse are you?** Civilian RN _____ Military RN _____
4. **Highest degree in nursing:** Baccalaureate ____ Master's ____ Doctorate ____
5. **Years experience as a Registered Nurse:** _____
6. **Have you ever worked in a trauma unit or emergency department as an RN?** No __ Yes__, if yes, how many years? _____

Sense of your confidence for trauma nursing skills

Please read each statement and indicate your degree of confidence for each element of the skills noted below.

not at all confident=1; slightly confident=2; confident=3; highly confident=4

Cervical spine immobilization skill

1. I can recognize the need to immobilize a cervical spine	1 2 3 4
2. I can recognize contraindications of applying a cervical collar	1 2 3 4
3. I can select the correct size cervical collar	1 2 3 4
4. I can correctly apply a cervical collar on an adult	1 2 3 4
5. I can recognize indications for ceasing application of a cervical collar	1 2 3 4

Acute hemorrhage control skill (tourniquet application)

1. I can recognize an acute hemorrhage situation	1 2 3 4
2. I can correctly select use of a pressure dressing vs. application of a tourniquet for bleeding control	1 2 3 4
3. I can correctly apply a tourniquet in under 15 seconds for bleeding control	1 2 3 4
4. I can accurately assess the effectiveness of a tourniquet	1 2 3 4
5. I can evaluate the risks vs. benefits for tourniquet use in situations	1 2 3 4

Upper airway protection

1. I can recognize signs and symptoms of risk to upper airway patency	1 2 3 4
2. I can recognize the need to protect the upper airway	1 2 3 4
3. I can select the correct size of nasal airway device	1 2 3 4
4. I can correctly insert a nasal airway	1 2 3 4
5. I can recognize indications for ceasing insertion of a nasal airway	1 2 3 4

Knowledge about the trauma nursing skills

Please read each question and select your choice for an answer.

1. A fall from what level is considered risk for cervical spine injury:
   __ 10 ft. __15 ft. __20 ft. __ 25 ft.

2. A cervical collar should only be applied if the patient has a significant history and actual symptoms of cervical spine injury. ___ This is false ____ This is true

3. Cervical collar application can result in accentuation of neurological symptoms
   ___ This is false ____ This is true

4. If a patient begins to vomit immediately after application of a cervical collar, the nurse should immediately remove the collar. ___ This is false ____ This is true

5. In any setting, application of a tourniquet is the preferred method to control profuse bleeding.
___ This is false ____ This is true

6. Once applied, a tourniquet should be released every 2 minutes to assure oxygenation of the tissues proximal to the injury ___ This is false ____ This is true

7. A tourniquet that is placed on a leg should be applied just below the groin area in order to achieve pressure on the femoral artery. ___ This is false ____ This is true

8. After a tourniquet has been placed the nurse notices that the blood flow has not stopped. The next thing to do is to elevate the extremity.
___ This is false ____ This is true

9. When inserting a nasal airway, the airway is initially inserted with the beveled end facing towards the nasal septum regardless of whether the right or left nare is cannulated with the airway. ___ This is false ____ This is true

10. A nasal airway is only used for persons who are unconscious
___ This is false ____ This is true

11. Use of a nasal pharyngeal airway is not the preferred method of choice to maintain an airway in a person who has sustained severe facial injuries and has a large amount of trauma to the oral pharyngeal area. ___ This is false ____ This is true

12. After insertion of a nasal airway, the nurse notices that there is a large amount of secretions in the patient's mouth; the first thing to do is suction the nasal airway.
___ This is false ____ This is true

After completion of this section you will be asked to complete three trauma nursing skills on the simulation mannequin. Please place this form in the envelope provided, seal it and give to the research assistant. Do not tell anyone your secret code! All information provided by you is anonymous)

Notes to IRB committee: *Re: rationale for demographic data and reference source for skills procedures. (These notes will not be on the assessment form given to the participant)*

1. *Re: demographic data: Age and gender are included in demographics as research shows that one's sense of self confidence can be influenced by age, gender, and prior experience with a skill. References for such include: (Pajares, F. (2002). Self-efficacy beliefs in academic contexts: an outline. Available at: http://des.emory,.edu/mfp/efftalk.html , Accessed Feb 14, 2012. ; Busch, T. (1995).*

Gender differences in self-efficacy and attitudes toward computers. Journal of Educational Computing Research, 12, 147-158.; Sethuraman, S., & Medley, M. D. (2009). Age and self-efficacy in programming. Journal of Computing Sciences in Colleges, 25(2), 122-128.

2. *Prior experience is included as logic dictates that those with prior experience in trauma or emergency department nursing will have a higher level of knowledge and perhaps sense of confidence than those that do not.*
3. *Madigan, K. (2009). Spinal Immobilization. In Emergency Nursing Procedures, 4th Edition, J. Proehl, Editor. Saunders-Elsevier P. 564-8.*
4. *Laerdal, (2005). Stifneck Select directions for use. (product insert) Wappingers Falls, NY.*
5. *Combat Application Tourniquet (CAT) Instructions for Use. Composite Resources. Available at: http://www.combattourniquet.com/pdf/C-A-T-Instructions-11October2007.pdf Accessed Feb 12, 2012.*
6. *Clark, D. (2009) Nasal Airway insertion. In Emergency Nursing Procedures, 4th Edition, J. Proehl, Editor. P. 19-21.*

Appendix 6
Skills Checklist Pre and Post Training

Tripler Army Medical Center / University of Hawaii at Manoa
Pre Training Assessment of Skills

Trauma Nursing Skills Performance Checklist *(Note: This sheet will not be shown to the student before instruction. At the pre training assessment session, the participant will be asked to demonstrate the psychomotor skill for each of these skills before instruction begins. The evaluator will read each scenario to the participant and then ask them to complete each of three skills (one at a time). The evaluator will note the performance of the participant without making any comment, and indicate if each skill element was completed by checking off yes or no. This paragraph will not be on the assessment form -- this is for IRB information only)*

Instruction to the participant: (To be read to the participant by the evaluator)

This session is composed of three different scenarios. One at a time, you will be read a scenario and then asked to complete the specific skill. At the conclusion of the skill performance assessment session, the evaluator will fold this assessment form in half and give it to you. We ask that you put your secret code number on the assessment form and then place the form in the envelope and seal it. Then, give the sealed envelope to the research assistant. At the end of the study, the research team will match all of the pre and post assessment forms by number so that we can measure for changes in scores.

I. **Cervical Collar Application**

Supplies for this skill: high fidelity mannequin, four (4) sizes of a Laerdal cervical collar (short, medium, long and no-neck).

Scenario / Instructions to the student: The patient has been brought in to the emergency department by his buddies. They state that the patient just fell from a height of 25 feet from a climbing tower. You decide that he requires a cervical collar. Select the correct collar and apply to the mannequin.

Inject: Immediately after the collar application the patient (mannequin) states: wow, I now feel tingling in both of my hands and arms.

A. Patient preparation

i. Stabilize the head manually in the position found, and instruct patient to not move ___Yes___ No

ii. Instruct patient to continue to remain still and let the health providers do the work ___ Yes___ No

iii. Instruct patient to alert the health providers if any maneuvers cause symptoms such as: increase in neck ___Yes ___ No

pain, tingling or numbness in extremities, difficulty breathing

iv. If wearing jewelry around neck, remove such jewelry. ___ Yes___ No

B. Collar preparation

i. Select proper sized collar: Use fingers to measure the distance from the top of the shoulder to the bottom of the chin [Note #4.] Locate the sizing line on the collar and match the collar size to the patient. When opened, assembled and applied, the sides of the collar should rest on the shoulders, while the front should lie between the upper chest and under the mandible, and the back of the collar should rest on the posterior thoracic spine, while maintaining the head in a neutral position, (assuring no hyper extension or hyper flexion of the head or neck). ___ Yes___ No

ii. Assemble the collar by pulling the front of the collar into the molded head support position and snapping to lateral lock tabs on either side of the collar. ___ Yes___ No

a. Procedural steps

i. Return patients head to the neutral position by placing thumbs under the mandible and the index and middle fingers on the occipital ridges. Use just enough traction to support the weight of the head while placing in neutral position. ___ Yes___ No

ii. With the collar open slide the lateral and back portion of the collar under the neck, while holding the front of the collar in place (under the mandible and resting of the front of the upper chest), and then secure the Velcro strap. ___ Yes___ No

iii. Assess for accentuation or development of new symptoms such as increased neck pain, numbness tingling in extremities or airway obstruction. ___ Yes___ No

II. **CAT Tourniquet Application** (Note #5)

<u>Supplies for this skill</u>: high fidelity mannequin moulaged with large quantity of blood, and active bleeding from lower extremity with bleeding reservoir; CAT tourniquet ; variety of pressure dressing material.

<u>Scenario / Instructions to the student</u>: The patient has been brought in to the emergency department by his buddies. There is a large pressure dressing in place, but very large quantities of blood are draining from the dressing. The buddies report that when he fell from a 20 foot tower he hit his leg on an iron rebar that was protruding from the ground. You decide that the patient requires a tourniquet. Apply the tourniquet.

Inject: After the tourniquet is applied, you notice that there is still a large amount of bleeding from his leg wound.

a. Patient preparation
- i. Expose the site to determine degree of blood loss and identify location to place tourniquet ___ Yes___ No
- ii. Inform the patient that the tourniquet will be rapidly applied to stop flow of blood. ___ Yes___ No

b. Assemble equipment
- **i.** Open the CAT tourniquet package and open the loop of the tourniquet band ___ Yes___ No
- **ii.** Open the Velcro from the windlass rod ___ Yes___ No

c. Procedural steps
- **i.** Insert the wounded extremity through the tourniquet loop, locating the tourniquet 2-3 inches above the bleeding wound ___ Yes___ No
- **ii.** Pull the tourniquet band tight and adhere the Velcro to secure tight ___ Yes___ No
- **iii.** Twist the windlass rod until the bright red bleeding has stopped ___ Yes___ No
- iv. Lock in place the windlass rod with the windlass clip ___ Yes___ No
- v. Adhere the band over the windlass rod to secure it in place ___ Yes___ No
- vi. Secure the tourniquet band with the large Velcro strap ___ Yes___ No
- vii. Reassess for cessation of bleeding, and adjust as needed ___ Yes___ No

III. Nasal Airway Insertion (Note #6)

Supplies for this skill: Nasal airways and endotracheal tubes in a variety of sizes. Oxygen mask.

Scenario / Instructions to the student: The patient has been brought in to the emergency department by his buddies. The buddies report that the patient fell from a high tower and during the fall they noticed that his face hit a tree branch. You now see a large amount of edema around the lips and mouth. You decide to insert a nasal airway. Insert the airway on the mannequin.

Inject: After the nasal airway is inserted the patient begins to gag violently.

a. Patient preparation
- i. Place patient in supine position or high fowlers ___ Yes___ No

ii. Identify the largest nostril, assess nasal passages for trauma, foreign body, septal deviation and polyps ___ Yes___ No

b. Assemble equipment

i. Water soluble lubricant ___ Yes___ No
ii. Suction equipment ___ Yes___ No
iii. Select the correct sized nasopharyngeal airway. (For diameter, select the largest diameter airway that will pass easily through the nares; for length, measure from the tip of the nose to the tragus of the ear.) An endotracheal tube may be used if an nasopharyngeal airway is not available. ___ Yes___ No

c. Procedural steps

i. Lubricate the tube with the water soluble agent ___ Yes___ No
ii. Pass the airway along the floor of the nostril with the bevel facing the nasal septum. Then, direct the device posteriorly and rotate slightly toward the ear (that is on the same side of the nostril of insertion), until inserted fully, and the flange rests against nostril. Be advised that all nasal airways have a bevel that is angled for right nare insertion. If the left nare is used, insert with the bevel facing the septum, but once the tip is in place, rotate 180 degrees to align the curvature of the airway with that of the naso-pharynx. ___ Yes___ No
iii. If during insertion resistance is met, slightly rotate the airway and proceed with insertion slowly. Never force insertion. ___ Yes___ No
iv. Assess for patency, suction as necessary. ___ Yes___ No

Tripler Army Medical Center / University of Hawaii at Manoa
Post Training Assessment of Skills

Trauma Nursing Skills Performance Checklist *(Note: This sheet will not be shown to the student before instruction. At the post training assessment session, the participant will be asked to demonstrate the psychomotor skill of completing each of these skills after instruction is completed. The evaluator will read each scenario to the participant and then ask them to complete each of three skills (one at a time). The evaluator will note the performance of the participant without making any comment, and indicate if each skill element was completed by checking off yes or no. This paragraph will not be on the assessment form -- this is for IRB information only)*

Instruction to the participant: (To be read to the participant by the evaluator)

This session is composed of three different scenarios. One at a time, you will be read a scenario and then asked to complete the specific skill. At the conclusion of the skill performance session, the evaluator will fold this assessment form in half and give it to you. We ask that you put your secret code number on the outside of the assessment form and then place the form in the envelope and seal it. Then, give the sealed envelope to the research assistant. At the end of the study, the research team will match all of the pre and post assessment forms by number so that we can measure for changes in scores.

IV. Cervical Collar Application

Supplies for this skill: high fidelity mannequin, four (4) sizes of a Laerdal cervical collar (short, medium, long and no-neck).

Scenario / Instructions to the student: The patient has been brought in to the emergency department by his buddies. They state that the patient just fell from a height of 25 feet from a climbing tower. You decide that he requires a cervical collar. Select the correct collar and apply to the mannequin.

Inject: Immediately after the collar application the patient (mannequin) states: wow, I now feel tingling in both of my hands and arms.

C. Patient preparation

v. Stabilize the head manually in the position found, and instruct patient to not move ___Yes___ No

vi. Instruct patient to continue to remain still and let the health providers do the work ___ Yes___ No

vii. Instruct patient to alert the health providers if any maneuvers cause symptoms such as: increase in neck pain, tingling or numbness in extremities, difficulty breathing ___Yes ___ No

viii. If wearing jewelry around neck, remove such jewelry. ___ Yes___ No

D. Collar preparation

iii. Select proper sized collar: Use fingers to measure the distance from the top of the shoulder to the bottom of the chin [Note #4.] Locate the sizing line on the collar and match the collar size to the patient. When opened, assembled and applied, the sides of the collar should rest on the shoulders, while the front should lie between the upper chest and under the mandible, and the back of the collar should rest on the posterior thoracic spine, while maintaining the head in a neutral position, (assuring no hyper extension or hyper flexion of the head or neck). ___ Yes___ No

iv. Assemble the collar by pulling the front of the collar into the molded head support position and snapping to lateral ___ Yes___ No

lock tabs on either side of the collar.

a. Procedural steps

i. Return patients head to the neutral position by placing thumbs under the mandible and the index and middle fingers on the occipital ridges. Use just enough traction to support the weight of the head while placing in neutral position. ___ Yes___ No

ii. With the collar open slide the lateral and back portion of the collar under the neck, while holding the front of the collar in place (under the mandible and resting of the front of the upper chest), and then secure the Velcro strap. ___ Yes___ No

iii. Assess for accentuation or development of new symptoms such as increased neck pain, numbness tingling in extremities or airway obstruction. ___ Yes___ No

V. **CAT Tourniquet Application** (Note #5)

<u>Supplies for this skill</u>: high fidelity mannequin moulaged with large quantity of blood, and active bleeding from lower extremity with bleeding reservoir; CAT tourniquet ; variety of pressure dressing material.

<u>Scenario / Instructions to the student</u>: The patient has been brought in to the emergency department by his buddies. There is a large pressure dressing in place, but very large quantities of blood are draining from the dressing. The buddies report that when he fell from a 20 foot tower he hit his leg on an iron rebar that was protruding from the ground. You decide that the patient requires a tourniquet. Apply the tourniquet.

<u>Inject:</u> After the tourniquet is applied, you notice that there is still a large amount of bleeding from his leg wound.

a. Patient preparation

i. Expose the site to determine degree of blood loss and identify location to place tourniquet ___ Yes___ No

ii. Inform the patient that the tourniquet will be rapidly applied to stop flow of blood. ___ Yes___ No

b. Assemble equipment

i. Open the CAT tourniquet package and open the loop of the tourniquet band ___ Yes___ No

ii. Open the Velcro from the windlass rod ___ Yes___ No

c. Procedural steps

i. Insert the wounded extremity through the tourniquet loop, locating the tourniquet 2-3 inches above the bleeding wound ___ Yes___ No
ii. Pull the tourniquet band tight and adhere the Velcro to secure tight ___ Yes___ No
iii. Twist the windlass rod until the bright red bleeding has stopped ___ Yes___ No
iv. Lock in place the windlass rod with the windlass clip ___ Yes___ No
v. Adhere the band over the windlass rod to secure it in place ___ Yes___ No
vi. Secure the tourniquet band with the large Velcro strap ___ Yes___ No
vii. Reassess for cessation of bleeding, and adjust as needed ___ Yes___ No

VI. Nasal Airway Insertion (Note #6)

Supplies for this skill: Nasal airways and endotracheal tubes in a variety of sizes. Oxygen mask.

Scenario / Instructions to the student: The patient has been brought in to the emergency department by his buddies. The buddies report that the patient fell from a high tower and during the fall they noticed that his face hit a tree branch. You now see a large amount of edema around the lips and mouth. You decide to insert a nasal airway. Insert the airway on the mannequin.

Inject: After the nasal airway is inserted the patient begins to gag violently.

a. Patient preparation
i. Place patient in supine position or high fowlers ___ Yes___ No
ii. Identify the largest nostril, assess nasal passages for trauma, foreign body, septal deviation and polyps ___ Yes___ No

b. Assemble equipment
i. Water soluble lubricant ___ Yes___ No
ii. Suction equipment ___ Yes___ No
iii. Select the correct sized nasopharyngeal airway. (For diameter, select the largest diameter airway that will pass easily through the nares; for length, measure from the tip of the nose to the tragus of the ear.) An endotracheal tube may be used if an nasopharyngeal airway is not available. ___ Yes___ No

c. Procedural steps
i. Lubricate the tube with the water soluble agent ___ Yes___ No

ii. Pass the airway along the floor of the nostril with the bevel facing the nasal septum. Then, direct the device posteriorly and rotate slightly toward the ear (that is on the same side of the nostril of insertion), until inserted fully, and the flange rests against nostril. Be advised that all nasal airways have a bevel that is angled for right nare insertion. If the left nare is used, insert with the bevel facing the septum, but once the tip is in place, rotate 180 degrees to align the curvature of the airway with that of the naso-pharynx. ___ Yes___ No

iii. If during insertion resistance is met, slightly rotate the airway and proceed with insertion slowly. Never force insertion. ___ Yes___ No

iv. Assess for patency, suction as necessary. ___ Yes___ No

Appendix 5 –Post Training Assessment & Post Program Evaluation

Tripler Army Medical Center and the University of Hawaii at Manoa

Simulation Study: Development of a Model to Compare of PC Screen Based and High Fidelity Simulation Instruction of Trauma Nursing Skills

Post Training Assessment Tool

Participant secret code: _____

Introduction: This is the post training assessment portion of the project. At this point In time you are being asked to complete this post training assessment.

3. First, enter your unique (and anonymous) 5 digit code that you developed for yourself and placed on the pre training assessment forms. This will allow us to match the pre and post assessment data without knowing who you are. Now enter this code on the top of this form in the *participant secret code section.*
4. Read the post training assessment questions and enter your answer for each item. When you have completed this part of the assessment, place this form in the envelope, seal it, and give to the research assistant. You will then be asked to proceed to the skills assessment portion of the project.

Sense of your confidence for trauma nursing skills

Please read each statement and indicate your degree of confidence for each element of the skills noted below.

not at all confident=1; slightly confident=2; confident=3; highly confident=4

Cervical spine immobilization skill

6. I can recognize the need to immobilize a cervical spine	1 2 3 4
7. I can recognize contraindications of applying a cervical collar	1 2 3 4
8. I can select the correct size cervical collar	1 2 3 4
9. I can correctly apply a cervical collar on an adult	1 2 3 4
10. I can recognize indications for ceasing application of a cervical collar	1 2 3 4

Acute hemorrhage control skill (tourniquet application)

6. I can recognize an acute hemorrhage situation	1 2 3 4
7. I can correctly select use of a pressure dressing vs. application of a tourniquet for bleeding control	1 2 3 4
8. I can correctly apply a tourniquet in under 15 seconds for bleeding control	1 2 3 4
9. I can accurately assess the effectiveness of a tourniquet	1 2 3 4
10. I can evaluate the risks vs. benefits for tourniquet use in situations	1 2 3 4

Upper airway protection

6. I can recognize signs and symptoms of risk to upper airway patency	1 2 3 4
7. I can recognize the need to protect the upper airway	1 2 3 4
8. I can select the correct size of nasal airway device	1 2 3 4
9. I can correctly insert a nasal airway	1 2 3 4
10. I can recognize indications for ceasing insertion of a nasal airway	1 2 3 4

Knowledge about the trauma nursing skills

Please read each question and select your choice for an answer.

13. A fall from what level is considered risk for cervical spine injury:
__ 10 ft. __15 ft. __20 ft. __ 25 ft.

14. A cervical collar should only be applied if the patient has a significant history and actual symptoms of cervical spine injury. ___ This is false ____ This is true

15. Cervical collar application can result in accentuation of neurological symptoms
___ This is false ____ This is true

16. If a patient begins to vomit immediately after application of a cervical collar, the nurse should immediately remove the collar. ___ This is false ____ This is true

17. In any setting, application of a tourniquet is the preferred method to control profuse bleeding. ___ This is false ____ This is true

18. Once applied, a tourniquet should be released every 2 minutes to assure oxygenation of the tissues proximal to the injury. ___ This is false ____ This is true

19. A tourniquet that is placed on a leg should be applied just below the groin area in order to achieve pressure on the femoral artery. ___ This is false ____ This is true

20. After a tourniquet has been placed the nurse notices that the blood flow has not stopped. The next thing to do is to elevate the extremity.
___ This is false ____ This is true

21. When inserting a nasal airway, the airway is initially inserted with the beveled end facing towards the nasal septum regardless of whether the right or left nare is cannulated with the airway. ___ This is false ____ This is true

22. A nasal airway is only used for persons who are unconscious
___ This is false ____ This is true

23. Use of a nasal pharyngeal airway is not the preferred method of choice to maintain an airway in a person who has sustained severe facial injuries and has a large amount of trauma to the oral pharyngeal area. ___ This is false ____ This is true

24. After insertion of a nasal airway, the nurse notices that there is a large amount of secretions in the patient's mouth; the first thing to do is suction the nasal airway. ___ This is false ____ This is true

After completion of this section you will be asked to complete three trauma nursing skills on the simulation mannequin. Please place this form in the envelope provided, seal it and give to the research assistant. Do not tell anyone your secret code! All information provided by you is anonymous)

Notes to IRB committee: *Re: rationale for demographic data and reference source for skills procedures. (These notes will not be on the assessment form given to the participant)*

7. *Prior experience is included as logic dictates that those with prior experience in trauma or emergency department nursing will have a higher level of knowledge and perhaps sense of confidence than those that do not.*
8. *Madigan, K. (2009). Spinal Immobilization. In Emergency Nursing Procedures, 4th Edition, J. Proehl, Editor. Saunders-Elsevier P. 564-8.*
9. *Laerdal, (2005). Stifneck Select directions for use. (product insert) Wappingers Falls, NY.*
10. *Combat Application Tourniquet (CAT) Instructions for Use. Composite Resources. Available at: http://www.combattourniquet.com/pdf/C-A-T-Instructions-11October2007.pdf Accessed Feb 12, 2012.*
11. *Clark, D. (2009) Nasal Airway insertion. In Emergency Nursing Procedures, 4th Edition, J. Proehl, Editor. P. 19-21.*

Simulation Learning: PC-Screen Based (PCSB) versus High Fidelity Simulation (HFS).
Version #1 Date: 1 February 2012

Tripler Army Medical Center and the University of Hawaii at Manoa

Simulation Study: Development of a Model to Compare of PC Screen Based and High Fidelity Simulation Instruction of Trauma Nursing Skills

Post Training Program Evaluation **Participant secret code: _____**

Check one: Training Group PC Screen based____ High Fidelity Simulation____

Introduction: This is a post simulation training program evaluation. At this point In time you are being asked to complete this evaluation of overall training program.

5. First, enter your unique (and anonymous) 5 digit code that you developed for yourself and placed on the pre training assessment forms. This will allow us to match the pre and post assessment data without knowing who you are. Now enter this code on the top of this form in the *participant secret code section*.
6. Read the post simulation training program evaluation questions and enter your answer for each item. When you have completed this evaluation, place this form in the envelope, seal it, and give to the research assistant.

Please read each statement and indicate your level of agreement for each of the statements below.
1=strongly disagree 2= disagree 3=neutral 4=agree 5=strongly agree

Instructional method

1. The method of instruction that I was assigned to is a good one for teaching these types of trauma nursing skills — 1 2 3 4 5
2. I was able to have any questions that I had answered during the teaching session for each skill — 1 2 3 4 5
3. There was enough time allotted to learn each of the skills adequately — 1 2 3 4 5
4. I feel that my time was well spent by participating in this training program — 1 2 3 4 5

Learning Outcomes

1. Attendance at this course increased my overall knowledge about these skills — 1 2 3 4 5
2. As a result of attending this training program, my ability to technically perform each of these skills has improved — 1 2 3 4 5
3. The content covered in this training program is adequate to teach each skill — 1 2 3 4 5

Learning environment

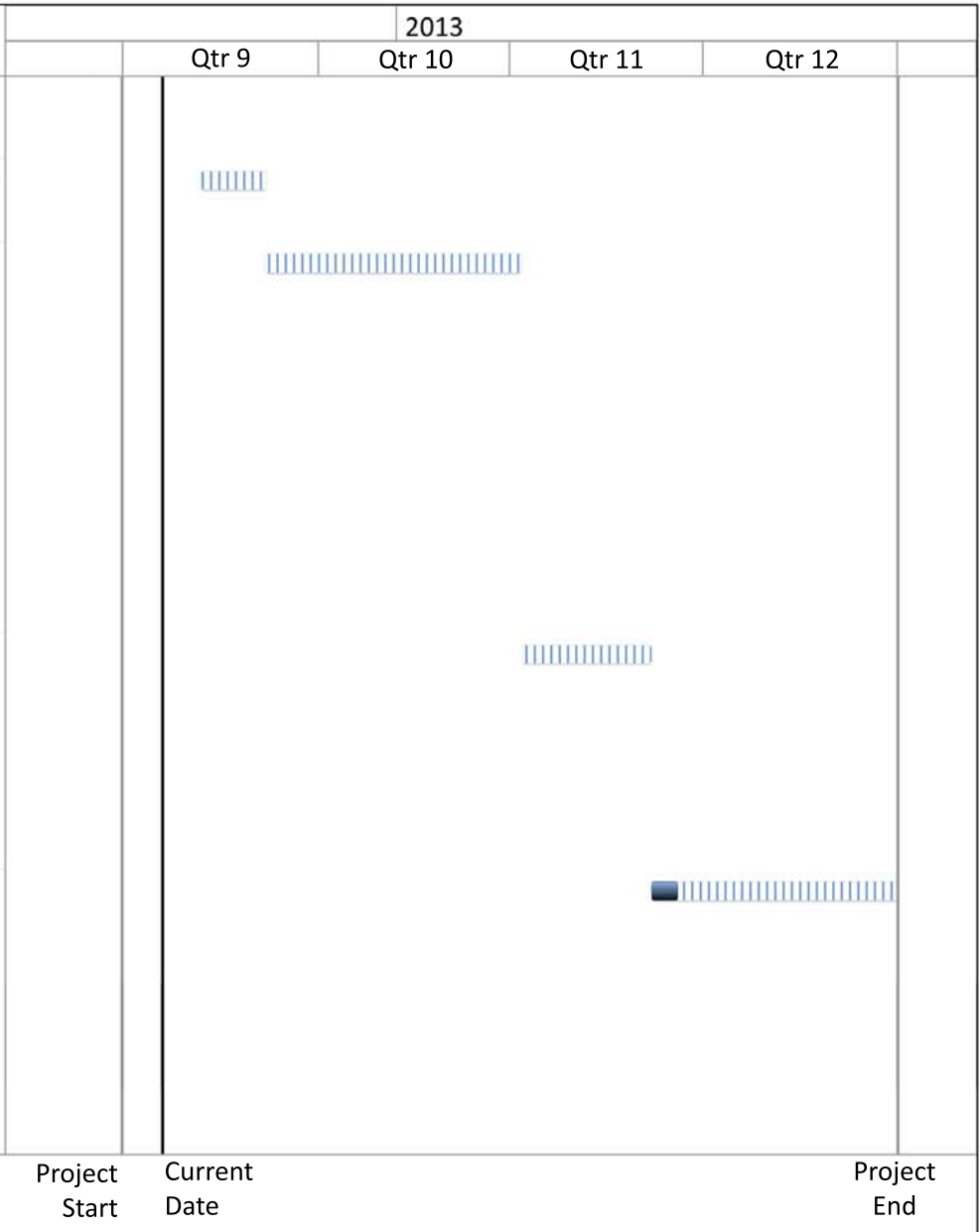
1. The learning environment milieu for this training program was satisfactory to me — 1 2 3 4 5
2. The pre and post program evaluator was professional — 1 2 3 4 5
3. Overall, I feel that my rights as a research participant have been respected — 1 2 3 4 5

General comments: Please feel free to enter any other comments that you have about the training program itself as well as the method that this study was conducted. Enter comments on the back of this sheet.

Note to the IRB committee: This post program evaluation tool has been developed based upon the *Office of Medical Education Research and Development Educational Program Evaluation Framework* from the College of Medicine at Michigan University. It seeks to assess, from the perspective of the participant, post program assessment of the teaching methods, learning outcomes, cost in terms of time for the participant, and the learning / program environment. A summary of this framework is available at: http://omerad.msu.edu/meded/progeval/step4.html Special care was made to not duplicate questions that are asked in the knowledge, confidence and clinical skills post assessment section. Additional program cost analysis will be completed by the health economist but will not involve human subjects.

Appendix F: Simulation learning PC screen-based vs high fidelity - No cost extension progress chart

QTR	Task Name	% Comp	Proposed Start Date	Proposed End Date
9 & 10	**Conduct full scale pilot**	**0%**	**Mon 10/1/12**	**Thu 2/28/13**
	- Conduct power analysis	0%	Mon 10/1/12	Wed 10/31/12
	- Recruit participants, (anticipated N=40); conduct pre- and post-training competency evaluation, and apply economic analysis model	0%	Wed 10/31/12	Thu 2/28/13
11	**Data Analysis: analyze data for educational and cost benefit outcomes**	**0%**	**Fri 3/1/13**	**Tue 4/30/13**
11 & 12	**Disseminate findings: submit publications; present at progressional conferences (e.g. Annual Asia Pacific Military Medicine Conference)**	**10%**	**Wed 5/1/13**	**Sat 8/24/13**



Project: Simulation Learning PC Screen-Based vs. High Fidelity Project
No-Cost Extension Progress Chart
Date: Thu 9/13/12

Task work in progress Task work completed

Title: Creating an Evaluation Model for Simulation Learning

COL Denise L. Hopkins-Chadwick, RN, PhD
Dr. Kristine Qureshi, RN, PhD
Dr. Judy Carlson, RN Ed.D

PURPOSE: To develop an evaluation model to determine if there is a difference in competency based learning outcomes and cost effectiveness between learning that is supported by PC screen-based computer simulation vs. high fidelity simulation mannequins for selected trauma nursing functions. **Theoretical Framework**: The *Nursing Education Simulation Framework* consisting of five key factors : (1) simulation design factors (reality of simulation, complexity of challenges posed), (2) teacher factors (skill, experience), (3) student factors (demographics, educational preparation, and prior professional experience), (4) educational practices (i.e. mode of delivery, time on task, learning setting, and environment), and (5) outcome factors (knowledge, psychomotor skills, self confidence, judgment, and problem solving).**DESIGN**: Non-Experimental, Descriptive study in 3 phases. Phase 1=*Development Phase*-Consists of development of scenarios, algorithms, and economic model. Phase 2= *Test of learning methods and delivery method*-Consists of a pilot test of the learning modules and measures, 2 learners for each module and methodology. Phase 3=*Model Development* Consists of a full scale pilot including pre- and post-training competency evaluation data collection and application of the economic analysis model. **SAMPLE:** 44 nurses for phase 2 and 3 (22 Civilian/22 military). **METHODS:** Each of the randomly assigned nurses will receive an orientation to use of both PCSB and HFS method to assure equivalent baseline psychomotor skills for each method. Comparable training lesson plans will be used for each treatment arm, and the competency of each trainee will be evaluated pre-and post-training by an evaluator who is blinded with regards to the trainees' prior experience as a professional nurse, as well as the assigned method (HFS vs. PCSB learning).

Learning Outcome	PCSB evaluation tools	HFS mannequin tools
Knowledge	Written pre- and post-test	Written pre- and post-test
Psychomotor skills	Critical Element Checklist	Critical Element Checklist
Self confidence	Student interview script	Student interview script
Judgment	Observation	Observation
Problem solving	Observation	Observation

DATA ANALYSIS: Data collection is underway. **IMPLICATIONS:** Developing a framework for evaluating simulation methods will provide a uniform way to comparing learning outcomes and cost effectiveness between different methods, **FROM/TO TIME PERIOD OF STUDY:** July 2010 to July 20121. **FUNDING:** TATRC (USAMMRAA)

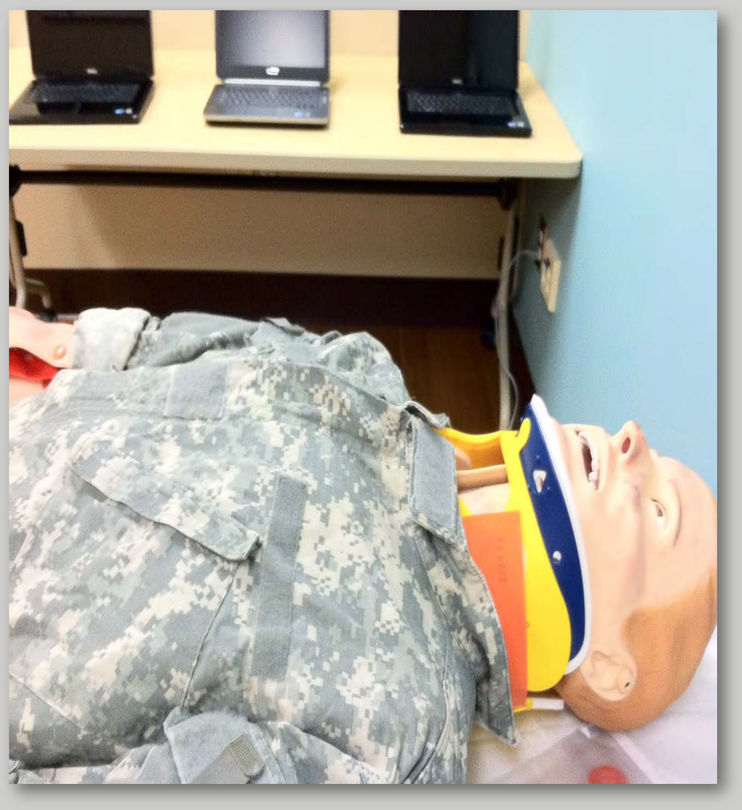
Development of an Evaluation Model to Compare PC Screen vs. High Fidelity Simulation Teaching for Trauma Nursing in Terms of Learning and Cost

Kristine Qureshi, RN, DNSc, CEN, APHN-BC (PI); COL Denise Hopkins-Chadwick, PhD (PI); Lori Wong, RN, PhD; Deborah Juarez, PhD; Dale Vincent, MPH, MD; Judith Carlson, RN, EdD; Jonathan Kevan (GA); Tracie Nagao-Bregman, (Admin)

Funded by TATRC

Background

- The number and complexity of natural disasters and military engagement continues to rise with increased numbers of wounded civilians and warriors.
- Core trauma care nursing competencies necessary for natural and manmade disaster response have been established, but little is known about the most effective and efficient methods for teaching trauma nursing skills using simulation.
- The Pacific Region geo-political environment is conducive to military and academic interdependency (partnerships).

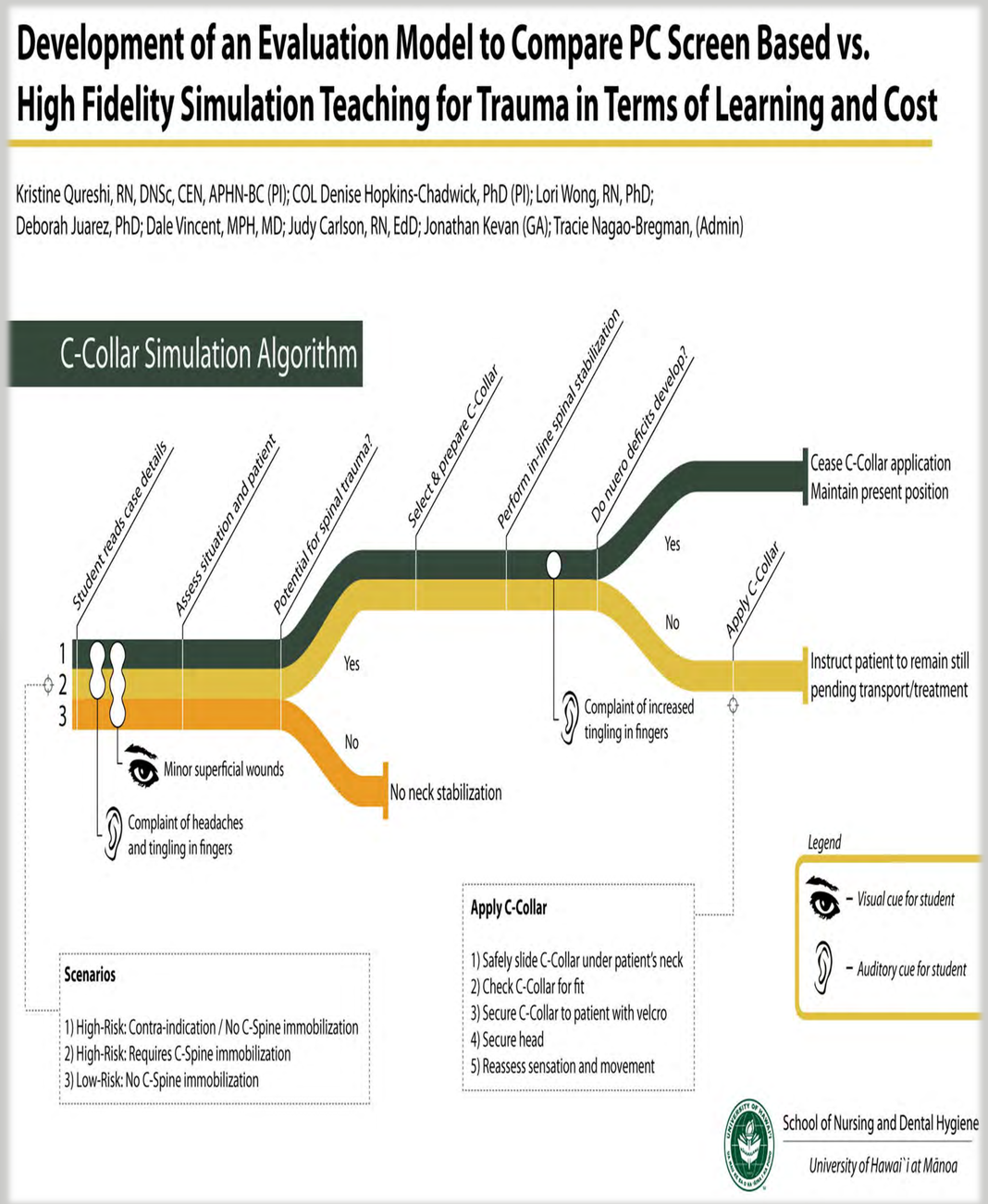


Research Question

Is there a difference in competency based learning outcomes and cost effectiveness between learning that is supported by PC screen based simulation vs. high fidelity simulation for selected nursing trauma skills?

Steps

1. Chose Disaster and Military Response Nursing Skills to train
2. Design PC Screen and High Fidelity Simulation Teaching modalities:
3. Pilot both modalities (n=4)
4. Teach both modalities (n=22)
5. Apply evaluative model



Nursing Skills Being Examined

- Neurological: Cervical spine injury – Assessment, cervical spine stabilization, C-collar selection and application
- Airway: Inhalation injury- Assessment and insertion of nasal trumpet
- Circulation: Acute hemorrhage- assessment and tourniquet application
- Circulation: Acute hemorrhage – IV fluid resuscitation

Importance

Gaining an understanding of the educational outcomes and costs for a variety of simulation methods will enable educators to select the most appropriate method of instruction in light of learning outcomes and costs of instruction.

Progress to Date

- Phase I IRB approval
- Skills selected
- Training modules developed
- Phase II & III IRB approval